Notice of Allowability	Application No.	Applicant(s)	
	10/822,616	SCHITTL ET AL.	
	Examiner	Art Unit	
	Meagan S. Walling	2863	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to *4/12/04 application*.

2. ☒ The allowed claim(s) is/are *1-11*.

3. ☒ The drawings filed on *12 April 2004* are accepted by the Examiner.

4. ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
   a) ☒ All b) ☐ Some* c) ☐ None of the:
      1. ☒ Certified copies of the priority documents have been received.
      2. ☐ Certified copies of the priority documents have been received in Application No. _____ .
      3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

   * Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

5. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.

6. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
   (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
      1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
   (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.

   Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).

7. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☒ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)
3. ☒ Information Disclosure Statements (PTO-1449 or PTO/SB/08), Paper No./Mail Date 4/12/04
4. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material
5. ☐ Notice of Informal Patent Application (PTO-152)
6. ☐ Interview Summary (PTO-413), Paper No./Mail Date _____ .
7. ☒ Examiner's Amendment/Comment
8. ☒ Examiner's Statement of Reasons for Allowance
9. ☐ Other _____.

DETAILED ACTION

An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

Authorization for this examiner's amendment was given in a telephone interview with Alexander Zinchuk on August 19, 2005.

The application has been amended as follows:

In claim 11, part (a), please replace "the tool is driven" with "a tool is driven".

In claim 11, part (b), please replace "the amplitude" with "an amplitude".

In claim 11, part (c), please replace "the inertia" with "an inertia".

Allowable Subject Matter

Claims 1-11 are allowed.

The following is an examiner's statement of reasons for allowance:

The primary reason for the allowance of claim 1 is the inclusion of the limitation of (a) driving the tool with a motor torque M_{Mot} with a sinusoidal shape with amplitude $\hat{M}_{Mot}$ and with two defined measurement frequencies f_1 and f_2; (b) measuring one of the $\hat{\omega}_R$ of the rotor speed ω_R of the motor and the amplitude of the gear unit torque $\hat{M}_G$; (c) calculating the inertia θ_S of the tool based on a mathematical model using variables $\hat{M}_{Mot}$, ω_R, f_1, f_2 and $\hat{M}_G$ and the previously determined inertia θ_R of the tool drive; and (d) determining the tool diameter from one of a given comparison table and comparison curve of a graph showing the relationship of tool inertia θ_S to

tool diameter. It is this limitation in the claimed combination that has not been found, taught, or suggested by the prior art of record that makes these claims allowable.

The primary reason for the allowance of claim 8 is the inclusion of the limitation of (a) accelerating the tool with a defined, constant torque M_{Mot}; (b) recording the $\omega(t)$ of the rotational speed over time; (c) determining an end value $\bar{\omega}_{end}$ of the rotational speed corresponding to the torque M_{Mot} and calculating the coefficient of friction $d_{tot} = \frac{M_{Mot}}{\bar{\omega}_{end}}$, (d) determining the time τ period from the start of the motor acceleration until reaching the $(1\text{-}e^{-1})$ fraction of the end value of the rotational speed $\bar{\omega}_{end}$; (e) determining the inertia of the tool according to the equation $\theta_S = \tau \cdot d_{tot} \cdot \theta_R$, where θ_R designates one of the known and previously determined inertia of the rotor of the drive motor including the gear unit; and (f) determining the tool diameter from one of a given comparison table and comparison curve of the relationship of the tool inertia θ_S to the tool diameter. It is this limitation in the claimed combination that has not been found, taught, or suggested by the prior art of record that makes these claims allowable.

The primary reason for the allowance of claim 10 is the inclusion of the limitation of (a) accelerating the tool with a defined, constant torque M_{Mot}; (b) recording the curve $\omega(t_n)$ of the rotational speed over time in mall time increments until a constant rotational speed ω_{end} is reached; (c) calculating a coefficient of friction with the equation: $d_{tot} = \frac{M_{Mot}}{\bar{\omega}_{end}}$, where $\bar{\omega}_{end}$ corresponds to the average rotational speed for the last data points of the recording of the rotational speed curve, where

$$\bar{\omega}_{end} = \frac{1}{(n_{end} - n_0)} \sum_{k=n_o}^{n_{end}} \omega_k, \text{ where } n = n_0, n_1, \ldots, n_{end} \text{ for } t > t_{n0} \text{ and } \omega_n = \omega_{end};$$

(d) determining the time constant τ of the slope of the rotational speed curve for the data points before the last data points used for determining the coefficient of friction $\bar{d}_{tot}$; calculating the inertia of the tool by the following formula: $\theta_S = \tau \cdot d_{tot} \cdot \theta_R$, where θ_R designates one of the known and previously determined inertia of the rotor of the drive motor including the gear unit; and (f) determining the tool diameter from one of a given comparison table and comparison curve of the relationship of the tool inertia θ_S to the tool diameter. It is this limitation in the claimed combination that has not been found, taught, or suggested by the prior art of record that makes these claims allowable.

The primary reason for the allowance of claim 11 is the inclusion of the limitation of (a) a tool is driven with a motor torque M_{Mot} with a sinusoidal shape with amplitude M_{Mot} and with two defined measurement frequencies f_1 and f_2; (b) an amplitude $\hat{\omega}_R$ of the rotor speed ω_R of the motor is measured or the amplitude of the gear unit torque $\hat{M}_G$ is measured; (c) an inertia θ_S of the tool is calculated based on a mathematical model using variables $\hat{M}_{Mot}$, $\hat{\omega}_R$, f_1, f_2 and $\hat{M}_G$ and the known or previously determined inertia θ_R of the tool drive; and (d) the tool diameter is determined from one of a given comparison table and comparison curve of a graph showing the relationship of tool inertia θ_S to tool diameter. It is this limitation in the claimed combination that has not been found, taught, or suggested by the prior art of record that makes these claims allowable.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Mortyama et al. (6,200,231) teaches a graph showing the relationship between inertia and diameter (see Fig. 9).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Meagan S. Walling whose telephone number is (571) 272-2283. The examiner can normally be reached on Monday through Friday 8:30 AM to 5 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, John Barlow can be reached on (571) 272-2269. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

msw

BRYAN BUI
PRIMARY EXAMINER

8/24/05